
Division 4

SECTION 04100**MASONRY MORTAR****PART 1 GENERAL****1.01 SUBMITTALS**

- A. Product data: Submit manufacturer's product specifications and mixing and installation instructions for each manufactured product.
- B. Samples: Submit actual mortar samples for colored mortar, indicating color range of each color selected., for approval by Owner's Project Manager.

1.02 DELIVERY, STORAGE AND HANDLING

- A. Store cement, lime and admixtures above ground level and covered for protection from moisture and contamination.

1.03 QUALITY CRITERIA

- A. For each type of cement specified, only one brand shall be used throughout project.

PART 2 PRODUCTS**2.01 MATERIALS**

- A. Portland cement: Meeting ASTM C150, Type I or III, natural color, domestic manufacture.
- B. Masonry cement: Meeting ASTM C91, non-staining, 22% maximum air content by volume.
- C. Hydrated lime: Meeting ASTM C207, Type S.
- D. Aggregate:
 - 1. For mortar: Clean, hard, natural, washed sand meeting ASTM C144.
 - 2. For cement grout: Meeting ASTM C476, fine aggregate.
- E. Water reducing and plasticizing admixture; acceptable products:
 - 1. Lambert Corporation, Mortartite.
 - 2. Master Builders Company, Omicron Mortarproofing.
 - 3. Sonneborn Division of Contech, Inc., Hydrocide.
- F. Water: Clean, potable, free from deleterious amounts of alkalis, acids and organic materials.

2.02 PROPORTIONS

- A. Type "S" job mixed mortar: Proportion materials by volume in accordance with ASTM C270 as follows:
 - 1. One part masonry cement to $\frac{1}{2}$ part Portland cement to aggregate proportioned at not less than $2\frac{1}{4}$ nor more than three times the volumes of cements used, or;
 - 2. One part Portland cement and $\frac{1}{4}$ to $\frac{1}{2}$ parts hydrated lime to aggregate proportioned at not less than $2\frac{1}{4}$ nor more than three times the combined volume of cement and lime used.

- B. Cement grout: Proportion materials by volume in accordance with ASTM C476 at one part Portland cement and 1/10 part lime to aggregate proportioned at not less than 2¼ nor more than three times the sum of volumes of cement and lime used.
- C. Type "N" job mixed mortar: Proportion materials by volume in accordance with ASTM C270 as follows:
 - 1. One part masonry cement to aggregate proportioned at not less than 2 1/4 nor more than 3 times the volumes of cements used, or
 - 2. One part Portland cement and over 1/2 to 1 1/4 parts hydrated lime to aggregate proportioned at not less than 2 1/4 nor more than 3 times the volumes of cements used.

PART 3 EXECUTION

3.01 MIXING

- A. Mix mortar and cement grout in power-driven, drum type mixers. Operate mixer minimum of five minutes after addition of all materials.
- B. Add water reducing and plasticizing admixture to all mortars in accordance with manufacturer's product data. Addition of other admixtures, including anti-freeze ingredients, will not be permitted.
- C. Measure materials in a one cubic foot container. Do not measure by shovels.

3.02 PLACING MORTAR AND GROUT

- A. Place mortar as directed in Concrete Unit Masonry sections.
- B. Retemper mortar to keep plastic. Use no mortar after setting has begun or after 2½ hours of initial mixing.
- C. Place cement grout as specified in other specification sections.

3.03 SCHEDULE

- A. For standard concrete unit masonry: Type S natural color mortar.
- B. For fire-rated concrete unit masonry: Type S natural color mortar.
- C. For reinforced concrete unit masonry: Type S natural color cement.
- D. For brick unit masonry: Type N natural color mortar.

END OF SECTION

SECTION 04110**NON-SHRINK GROUT****PART 1 GENERAL****1.01 SUBMITTALS**

- A. Product data: Submit manufacturer's product specifications and mixing and installation instructions for each manufactured product.

1.02 DELIVERY, STORAGE AND HANDLING

- A. Store cementitious materials above ground level and covered for protection from moisture and contamination.

1.03 QUALITY CRITERIA

- A. Only one brand shall be used throughout project.
- B. Materials shall conform to CRD-C-612, Corps of Engineers Specification for Non-Shrink Grout.

PART 2 PRODUCTS**2.01 MATERIALS**

- A. Non-shrink grout; acceptable products (metallic):
 - 1. Euclid Chemical Company, "Firmix".
 - 2. Master Builders, Embeco 636.
 - 3. Other equivalent products acceptable to Owner's Project Manager
- B. Non-shrink grout; acceptable products (non-metallic):
 - 1. Euclid Chemical Company, "Euco N5".
 - 2. Master Builders, "Masterflow 713".
 - 3. L & M Construction Chemicals, Inc., "Crystex".
 - 4. Other equivalent products acceptable to Owner's Project Manager
- C. Water: Clean, potable, free from deleterious amounts of alkalis, acids and organic materials.
- D. All exposed grout shall be the non-metallic type.

PART 3 EXECUTION**3.01 MIXING**

- A. Mix non-shrink grout with water per manufacturer's product data to achieve a minimum compressive strength of 7,000 psi at 28 days. Mix mortar and cement grout in power-drive, drum type mixers. Operate mixer minimum of five minutes after addition of all materials.

3.02 PLACING GROUT

- A. Place non-shrink grout as specified in "Metal Fabrications", "Mechanical", "Electrical", or any other Sections where non-shrink grout is indicated.

END OF SECTION

SECTION 04150**MASONRY ACCESSORIES****PART 1 GENERAL****1.01 SUBMITTALS**

- A. Submit manufacturer's product data marked to indicate only items proposed for use in project.

PART 2 PRODUCTS**2.01 MASONRY JOINT REINFORCEMENT**

- A. Acceptable manufacturers:
 - 1. AA Wire Products Co.
 - 2. Dur-O-Wal, Inc.
 - 3. Jim Taylor, Inc.
 - 4. Masonry Reinforcement Corporation.
- B. Masonry joint reinforcement:, Ladder type:
 - 1. Fabricate from cold-drawn wire meeting ASTM A82.
 - 2. Longitudinal rods 9 ga. deformed wires with 9 ga. galvanized cross wires welded to form ladder pattern.
 - 3. Width of reinforcement shall be 2" less than total wall width.
 - 4. Provide reinforcement in 10'-0" lengths with prefabricated corners and tees at intersecting walls.
 - 5. Reinforcement for cavity walls to receive masonry veneer shall be of length to penetrate to within 1" of exterior face.

2.02 DOVETAIL ANCHORS

- A. Acceptable Manufacturers:
 - 1. AA Wire Products Company
 - 2. Dur-O-Wal, Inc.
 - 3. Heckmann Building Products, Inc.
 - 4. Jim Taylor, Inc.
 - 5. Masonry Reinforcing Corporation.
- B. Dovetail anchor characteristics:
 - 1. Material: Minimum 16 ga. galvanized steel.
 - 2. Size: Length to penetrate to within 1" of opposite face of masonry by 1" wide.

2.03 WALL REINFORCING

- A. Bars: Meeting ASTM A615, deformed, Grade 60, size as indicated.

2.04 COLUMN ANCHORS

- A. Acceptable manufacturers:
 - 1. AA Wire Products Company
 - 2. Dur-O-Wal, Inc.
 - 3. Heckmann Building Products, Inc.
 - 4. Jim Taylor, Inc.
 - 5. Masonry Reinforcing Corporation.
- B. Type: Strap anchors and triangular or web ties.
- C. Material: Galvanized steel.

- D. Size and Configuration:
 - 1. Anchor Straps: 12 gauge x 3/4" x 9.
 - 2. Ties: 3/16" diameter by sizes indicated.

2.05 BEAM ANCHORS

- A. Type: Corrugated, weld on type.
- B. Material: Galvanized Steel.
- C. Size: 2½" by 8" by 1/8" thickness with return for welding to steel member.

2.06 TRIANGULAR TIES

- A. Triangle ties shall be No. 400 Flex-O-Lok galvanized wire ties by AA Wire Products Company or equal.
- B. Anchors for triangular ties shall be NO. 401C galvanized anchors by AA Wire Products Company or equal.

2.07 WEB TIES

- A. Web ties shall be No. 400 Flex-O-Lok galvanized wire ties by AA Wire Products Company or equal.
- B. Anchors for web ties shall be No. 401C galvanized anchors by AA Wire Products Company or equal.

2.08 VERTICAL EXPANSION JOINTS

- A. Construction:
 - 1. Bellows formed of 6" wide strip of 1/16" thick black neoprene.
 - 2. Flanges of 2" width, .018" thick stainless steel with ¼" diameter holes at 4" on center and bonded to each side of neoprene bellows.
 - 3. Length minimum 10 feet.

2.09 RUBBER CONTROL JOINTS

- A. Acceptable manufacturers:
 - 1. AA Wire Products Company
 - 2. Dur-O-Wal, Inc.
 - 3. Jim Taylor, Inc.
 - 4. Masonry Reinforcing Corporation.
- B. Type: 2-5/8" wide, extruded natural or synthetic rubber, meeting ASTM D2000, Type 2AA-805, 70 durometer hardness.

2.10 WIRE MESH HARDWARE CLOTH

- A. Type ½" by 16 ga. galvanized steel mesh, 2" less than wall width.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install masonry joint reinforcement in masonry walls at 1'-4" o.c. vertically. Lap side rods 6" minimum at splices. Stop reinforcement 1" back from expansion and control joints and openings in masonry walls. Install reinforcement in first and second bed joint above and below openings, with non-continuous reinforcement extending 2'-0" beyond jamb, each side.

- B. Install dovetail anchors vertically in cast-in-place concrete surfaces adjacent to masonry walls. Install anchors at 1'-4" o.c. maximum, vertically.
- C. Install adjustable wall ties in concrete unit masonry walls to receive masonry facing. Space ties not exceeding 1'-4" o.c. vertically and horizontally.
- D. Install column anchors 2'-8" on center on flange of steel columns. Attach ties and set in mortar bed.
- E. Install beam anchors 4'-0" on center at beams running adjacent to masonry.
- F. Install veneer anchors using the manufacturer's screw as recommended for the substrate.
- G. Install vertical expansion joints in masonry construction at location indicated. Make joints 1" in width and keep clean of masonry droppings. Install prefabricated joint in parge of mortar. Lap sections 6" minimum. Caulk expansion joints using exterior sealant as specified in Sealants section.
- H. Install rubber control joints as specified in the Concrete Unit Masonry section.
- I. Install wire mesh hardware cloth to prevent migration of grout from masonry units indicated to be grouted.

END OF SECTION

SECTION 04220**CONCRETE UNIT MASONRY****PART 1 GENERAL****1.01 SUBMITTALS**

- A. Samples: Submit three samples for each type concrete masonry unit, indicating range of color and texture to be expected in finished work.
- B. Certificates: Submit certificates from masonry manufacturer in triplicate prior to delivery of concrete masonry units to project site. Each certificate shall be signed by an authorized officer of the manufacturing company and shall contain the name and address of the Design-Builder, the project location and the quantities and date or dates of shipment or delivery to which the certificate applies. Units shall be certified for compliance with specification requirements including compressive strength, moisture content, linear drying shrinkage and time rated fire-resistance.

1.02 DELIVERY, STORAGE AND HANDLING

- A. Keep units dry. Allow air circulation around stacked units. Remove wet units from site.

1.03 JOB CONDITIONS

- A. Environmental requirements:
 - 1. Lay no masonry when temperature of surrounding air has dropped below 45° F., unless it is rising; and at no time when temperature has dropped below 40°F., except with written permission from the Owner's Project Manager.
 - 2. When masonry work is authorized at temperature below 40°F. but above freezing, provide mortar at temperature between 70° and 100° F. Maintain air temperature above 40° F. on both sides of masonry for 72 hours after laying.
 - 3. Protect masonry construction from direct exposure to wind and sun when erected in ambient air temperatures of 95° F. in shade with relative humidity less than 50%.
- B. Protection of work:
 - 1. Keep walls dry during erection by covering at end of each work period with a waterproof membrane; similarly protect partially completed walls not being worked on. Covering shall overhang at least 2'-0" on each side of wall.
 - 2. Protect finished exposed work from stains.
 - 3. Mortar droppings that stick to unit faces shall be allowed to dry, and then removed with trowel and surface lightly scrubbed with bristled brush.
 - 4. Particular care shall be given to keeping masonry units clean in areas not to be painted.
- C. Install and inspect mechanical and electrical work prior to covering with masonry. Where runs of piping or conduit are required, cut away web of masonry unit without disturbing face or bond.
- D. Coordinate installation of masonry anchors with structural system to which masonry is attached.

1.04 QUALITY CRITERIA

- A. Allowable tolerances:
 - 1. Maximum variation from plumb: 1/4" in 10'-0"; not exceeding 3/8" in 20'-0".
 - 2. Maximum variation from level: 1/2" in 20'-0"; not exceeding 1/2" in 40'-0" or more.

3. Maximum variation in linear building line from location indicated: ½" in 20'-0".

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Hollow load-bearing units:
 1. Meeting ASTM C90, Grade N.
 2. Nominal face dimensions: 8" by 1'-4".
 3. Weight: Normal weight; minimum 125 lbs./cu. ft.
- B. Solid load bearing units:
 1. Meeting ASTM C145, Grade N.
 2. Nominal face dimensions: 8" by 1'-4".
 3. Weight: Normal weight; minimum 125 lbs./cu. ft.
- C. Hollow non-load-bearing units:
 1. Meeting ASTM C129, Type I.
 2. Nominal face dimensions: 8" by 1'-4".
 3. Weight: Normal weight; minimum 125 lbs./cu. ft.
- D. Fire-rated units: Manufacture in accordance with Underwriters' Laboratories, Inc., (UL) Standard UL-618, "Standard for Concrete Masonry". Manufacturer shall be one capable of furnishing specified certification that units are manufactured per UL requirements for ratings indicated.

2.02 ACCESSORY PRODUCTS

- A. Weep hole material: 3/8" diameter cotton rope.
- B. Masonry cleaning compound:
 1. Acceptable products:
 - a. Hallmark Chemical Corporation, DC-6.
 - b. National Chemsearch Corporation, Deox.
 - c. Process Solvent Company, Sure Kleen 600.
 - d. Other products specifically approved by the Owner's Project Manager.

PART 3 EXECUTION

3.01 SAMPLE WALL PANEL

- A. Lay a 6'-0" long by 5'-4" high sample panel representing each type masonry used in project. Orient as directed by the Design-Builder with the approval of the Owner's Project Manager.
- B. Indicate the following:
 1. Bonding.
 2. Mortar color.
 3. Joint tooling.
 4. Color and texture.
 5. Reinforcement.
 6. Workmanship.
 7. Sealer.
 8. Precast sills.
 9. Grouting.

- C. Prepare panel at least 14 days prior to beginning masonry work. Should panel not be acceptable to the Owner's Project Manager, prepare additional panel(s) until accepted by the Owner's Project Manager.
- D. Maintain panel throughout work as standard of masonry work. Do not destroy panel until directed by the Owner's Project Manager.

3.02 WORKMANSHIP

- A. Workmanship
 - 1. Lay only dry masonry units.
 - 2. Lay masonry plumb, level and true to line with accurate coursing.
 - 3. Lay units in running bond with joints centered in alternate courses.
 - 4. Cutting of masonry shall be done with abrasive power saw. Lay out work to minimize cutting.

3.03 BUILDING IN OF OTHER WORK

- A. Build in work of other trades that are to be built in with masonry, including anchors, wall plugs, expansion joints and accessories, as erection progresses.
 - 1. Coordinate with each trade for embedded items
 - 2. Coordinate and provide for future items by placing embedded items as specified in Section 11190 – Detention Equipment.
- B. Fill hollow metal frames in masonry walls with cement grout as wall is laid. Rake back ½" joint between hollow metal frame and adjacent masonry to receive sealant.
- C. Lay masonry to receive flashing with smooth joints free from projections which might puncture flashing materials. Provide mortar on both sides of flashing in masonry joints.
- D. Unless indicated otherwise, provide minimum 8" of solid end bearing full height of wall from floor to bearing points for lintels, beams and other load-supporting members by either solid block or filling cores with cement grout.
- E. Provide lintels and bond beams where indicated using lintel blocks laid with joints matching adjacent work. Reinforcement shall be as indicated and block filled with cement grout.

3.04 MORTAR JOINTS

- A. Lay masonry in required mortar beds as required for best masonry practices and as acceptable to Owner's Project Manager.
- B. Adjustment shall be made only while mortar is still soft and plastic by tapping to plumb and bringing to alignment.
- C. Keep bed and head joints uniform in width, except for minor variations required to maintain bond and locate returns. Standard thickness for all mortar joints shall be 3/8".
- I. Weep holes:
 - 1. Provide weep holes in exterior wythe of masonry at 2'-8" o.c. horizontally at heads and sills of openings, in exterior walls at grade, and in other locations where flashing is provided.
 - 2. Keep weep holes and area above flashing free of mortar droppings.

3.05 EXPANSION JOINTS

- A. Expansion Joints

1. Make joints 1" wide, unless otherwise indicated.
2. Keep joint clear of mortar by temporarily filling with fiberboard as wall is laid.
3. Stop horizontal joint reinforcement 1" from expansion joint.
4. Leave joint open and clean for caulking in accordance with Sealants section.

3.06 CONTROL JOINTS

- A. Control Joints
 1. Make joint 3/8" wide, unless otherwise indicated.
 2. Stop horizontal joint reinforcement 1" from control joint.
 3. Keep joint clean of debris and mortar.
 4. Provide joints:
 - a. In running walls spaced not more than 40'-0" o.c.
 - b. At intersecting walls, either of which is more than 10'-0" long.
 - c. At intersections with concrete walls.
 - d. At joint between masonry and structural slabs, columns, beams or decks.
 5. Leave joint open and clean for caulking in accordance with Sealants section.

3.07 JOINT TREATMENT

- A. Flush joints: Strike joints flush in masonry to receive finish work of trades other than painting.
- B. Tooled joints: Strike exposed joints in standard masonry units flush and, when partially set, tool using concave tool.

3.08 CLEANING

- A. Maintain masonry free of mortar droppings as work progresses and at completion of work. Rub masonry to remove excess mortar.

END OF SECTION